Basic String & List Operation

Topics

- Length
- Concatenation
- Repetition
- Indexing
- Slicing
- String splitting

Definitions

- String: Sequence of characters
- List: sequence of data

```
#string
s = "Hello"; t = "Python"

#list
x = [1,3,5,7]; y = [5,6,7,8]
rps = ["rock","paper","scissors"]
```

Concatenation

```
#string
s = "Hello"; t = "Python"

#list
x = [1,3,5,7]; y = [5,6,7,8]

r = s+t
z = x+y

print("r =",r)
print("z= ",z)
```

```
r = HelloPython
z=  [1, 3, 5, 7, 5, 6, 7, 8]
```

length

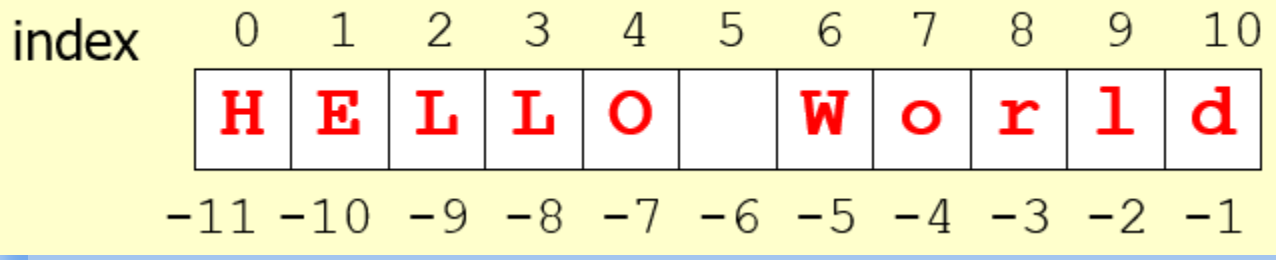
```
#string
s = "Hello"; t = "Python"

#list
x = [1,3,5,7]; y = [5,6,7,8]

r = s+t
z = x+y
```

```
r = HelloPython
z=  [1, 3, 5, 7, 5, 6, 7, 8]
```

```
#length
print(len(s), len(x), len(r), len(z))
```

```
5 4 11 8
```

Indexing




```
s = "Hello"
x = [1,3,5,7]
print(s[0], s[1], s[2], s[3], s[4])
#print(s[5])

print(x[0], x[1], x[2], x[len(x)-1])
#print(x[4])
```

```
H e l l o
1 3 5 7
```

```
s = "Hello"
x = [1,3,5,7]
```

Negative indexing


```
print(s[-1], s[-2], s[-3], s[-4],s[-5])
#print(s[-6])

print(x[-1], x[-2], x[-3], x[-4])
#print(x[-5])
```

```
o l l e H
7 5 3 1
```

Slicing

```
s = "Hello there, General Kenobi."
x = [1,3,5,7]
print(s[0:3:1])  #startindex,stopindex(NOT include),step
print(s[5:11:1])
print(s[0:11:2])
print(s[30:35:2]) #out of range
print(s[-1:-4:-1]) #negative range

print(x[1:4:1])
print(x[1:8:1])
print(x[-3:3:1]) # negative range
print(x[-5:3:1]) #negative out of range
```

```
Hel
 there
Hlotee

.ib
[3, 5, 7]
[3, 5, 7]
[3, 5]
[1, 3, 5]
```

```
print(s[-1:0:-1])
```

```
.iboneK lareneG ,ereht olle
```

Slicing abbreviation

```
s = "Hello there, General Kenobi."
x = [1,3,5,7,9,11]

print(s[:5:])    #start at 0, to position 4, step 1
print(s[:5])
print(x[1::2])   #start at 1, to last data, step 2
print(x[:2:-1]) #not specify start but go back,
                #will start at the last data
                #and stop before reaching position 2
print(x[-2::-1])
print(x[::-1])   #reverse list
```

```
Hello
Hello
[3, 7, 11]
[11, 9, 7]
[9, 7, 5, 3, 1]
[11, 9, 7, 5, 3, 1]
```

No start -> 0
No stop -> len
No step -> 1

For negative step
No start -> -1
No stop -> -(length+1)

Modification

```
[58] s = "Hello there"
     s[5]="d"
```

```
---------------------------------------------------------------
TypeError                                 Traceback (most
<ipython-input-58-f508f878a066> in <module>()
      1 s = "Hello there"
----> 2 s[5]="d"

TypeError: 'str' object does not support item assignment
```

SEARCH STACK OVERFLOW

```
s = s[:5]+"d"+s[6::]
print(s)
```

```
Hellodthere
```

Range Modification!

```
x[2:5] = [6,8,10]
print(x)
```

```
[1, 3, 6, 8, 10, 11]
```

```
[53] x = [1,3,5,7,9,11]
     x[3]=999
     print(x)
```

```
[1, 3, 5, 999, 9, 11]
```

Repetition

```
a = 10*[0]
b = [23]*5
s1 = "Ora"*10
s2 = 10*"Muda"

print(a)
print(b)
print(s1)
print(s2)
```

```
[0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
[23, 23, 23, 23, 23]
OraOraOraOraOraOraOraOraOraOra
MudaMudaMudaMudaMudaMudaMudaMudaMudaMuda
```

Operation Summary

Operation	For string	For list
Length	len("Hello“)	Len([1,2,3])
Concatenate	"Hello"+" there"	[1]+[2+3]
Repeated concatenate	"A“ *3	[1,2] * 3
Indexing	s[index]	L[index]
Slicing	s[start : stop : step]	

Example 1 Extract 6230012021

62 -> Enrollment year
3 -> Academic degree
21 -> Faculty code

```
s = input()
enYear = s[:2]
degree = s[2]
faCode = s[-2::1]

print(enYear)
print(degree)
print(faCode)
```

```
6230012021
62
3
21
```

Exercise 2-1

- Please see Colab

Example 2

Get a number from keyboard and print its corresponding day.

1 -> Monday
2 -> Tuesday
3 -> Wednesday
4 -> Thursday
5 -> Friday
6 -> Saturday
7 -> Sunday

```
days = ["MO","TU","WE","THU","FRI","SAT","SUN"]
k = int(input())
k -= 1
print(days[k])
```

```
3
WE
```

Example 3


```
H = "HBD"
T = "2U"

Happy = (H+T)*2 + " " + H*2 + " " + H+T
print(2*(Happy + " -- "))
```

```
HBD2UHBD2U HBDHBD HBD2U -- HBD2UHBD2U HBDHBD HBD2U --
```

```
[4] x=([0,1]*2 + [3,4])*3
    print(x)
```

```
[0, 1, 0, 1, 3, 4, 0, 1, 0, 1, 3, 4, 0, 1, 0, 1, 3, 4]
```

Exercise 2-2

- Please see Colab

String Splitting


```
s = "Hello World    Oh my   gawd"
x = s.split()     #use white space to separate
print(x)
```

```
['Hello', 'World', 'Oh', 'my', 'gawd']
```

```
s2 = "11:2:   33"
x = s2.split(":")  #specifying a separator
print(x)
```

```
['11', '2', '   33']
```

```
s3 = "a,,,b"
x = s3.split(",")
print(x)
```

```
['a', '', '', 'b']
```

String Splitting (2)


```
s4 = "a,,,b"
x = s4.split(",,")
print(x)
```

```
['a', ',b']
```

```
s5 = "a   b"
x = s5.split(" ")
print(x)
```

```
['a', '', '', 'b']
```

```
#6420008921,10,20,30   score for 3 quizzes
# Let's find the average.

s = "6420008921,10,20,30"
x = s.split(",")
avg = (int(x[1])+int(x[2])+int(x[3]))/3
print(avg)
```

```
20.0
```

String Splitting (3)


```
#changing input "day/month/Buddhistyear" to "day/month/AD"
x = input().split("/")
buddhistYear = int(x[2])
christianYear = buddhistYear-543
print(x[0]+"/"+x[1]+"/"+str(christianYear))
```

```
07/05/2517
07/05/1974
```

Other string functions

functions (like split) are methods of string.

```
s = "    I have a bad feeling about this.    "
s1 = s.upper()
s2 = s.lower()
s3 = s.strip()

print(s1)
print(s2)
print(s3)
```

```
    I HAVE A BAD FEELING ABOUT THIS.
    i have a bad feeling about this.
I have a bad feeling about this.
```

Exercise 2-3

- Please see Colab